



Net-Zero Energy Installation

Fort Carson, CO

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Our Mission: A professional team of teams dedicated to sustainable hometown management, community well-being, and mission readiness

Leading Change for Installation Excellence



What is Net Zero?



- Draft Net Zero Energy Installation Initiative Implementation Plan
 - 5 installations Net Zero by 2015
 - Ft Carson recently accepted challenge
 - Reduce energy intensity, maximize use of renewable energy, reduce reliance on externally produced energy
 - What qualifies as renewables and energy secure is still being determined



Why is Ft Carson a Net Zero Energy Installation Candidate?



- Candidate criteria
 - Relatively lower energy intensity; Fort Carson (without housing) is at 125 KBTU/SF
 - 145,000 MWH/Year and 1,200,000 KCF/year
 - High renewable energy potential; Colorado has an established RPS
 - Supportive command environment
 - Local energy management champions
 - Supportive energy providers



Renewables: Bottom Line



Project (s)	Description	Renewables Impact
SOLAR ARRAY (Completed)	\$12M cost (Contractor Investment), PPA with Ft Carson for 20 year term	2-3% of Electrical Usage
WIND TURBINES (Under Development)	Likely a PPA	8-12% of Electrical Usage
SOLAR WALLS, SOLAR HOT WATER HEATING (Small Completed Projects)	Investment through ECIP	1-2% of Natural Gas Usage
SMALL PV APPLICATIONS (On-Going)	O&M, MILCON, ECIP	1-2% of Electrical Usage
NEW APPLICATIONS - GSHP & BIOMASS (2 GSHP Projects, Studying Biomass)	O&M, MILCON, ECIP, PPA	Biomass 12%-14% Natural Gas 12%-25% Electric Usage



Renewables: Bottom Line



- Some renewable successes but a long way from 100% renewable
- Need renewables in new construction (GSHP, PV, solar heating, transpired solar collectors, etc.)
- Need renewable power purchases (including off-site) to be part of net zero criteria or we will not get there (lack of available land)



Renewables

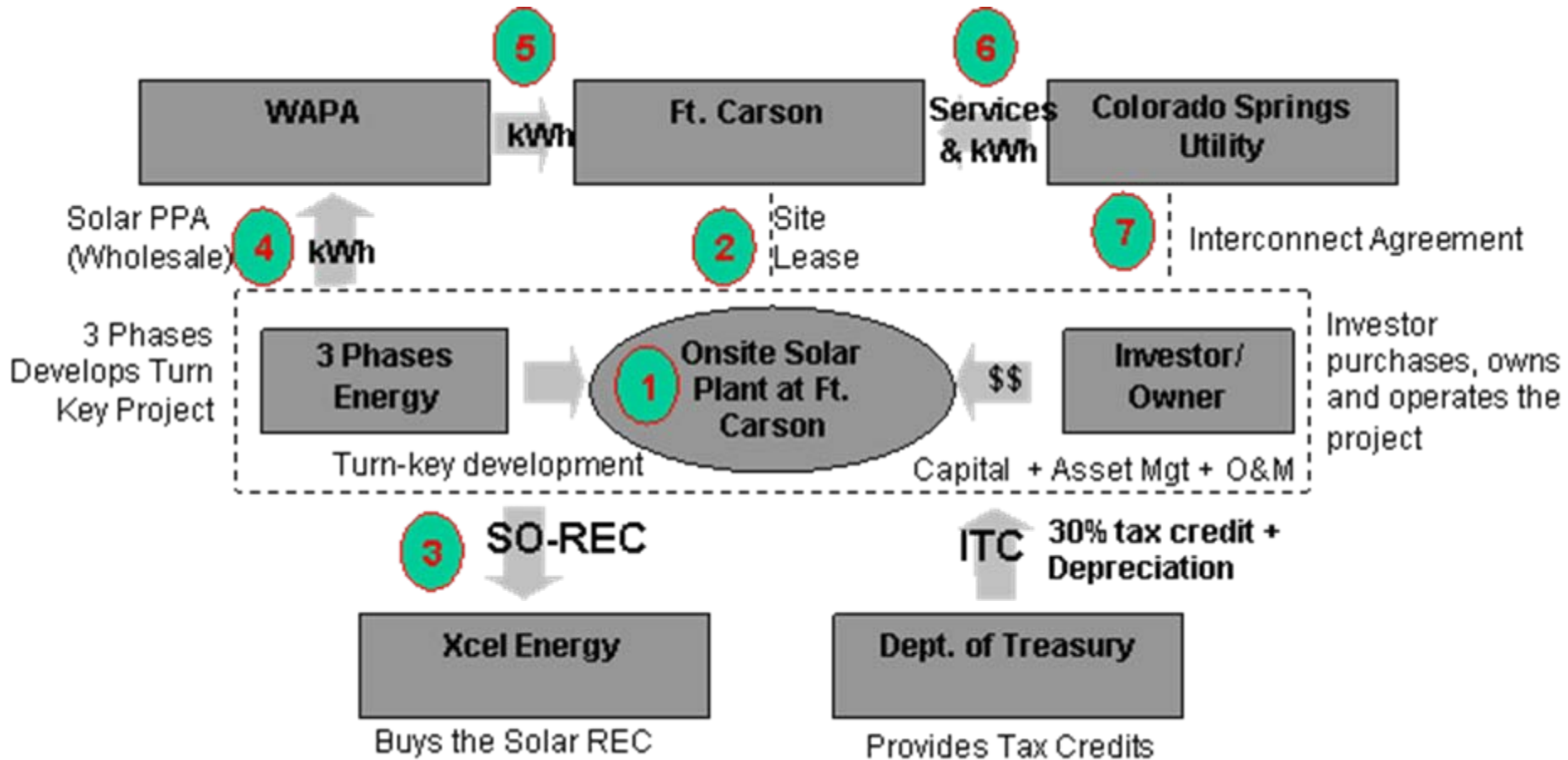


- Construction of on-site 2 MW solar array completed (2-3% of Ft Carson energy use)





Renewables: Carson Solar 1



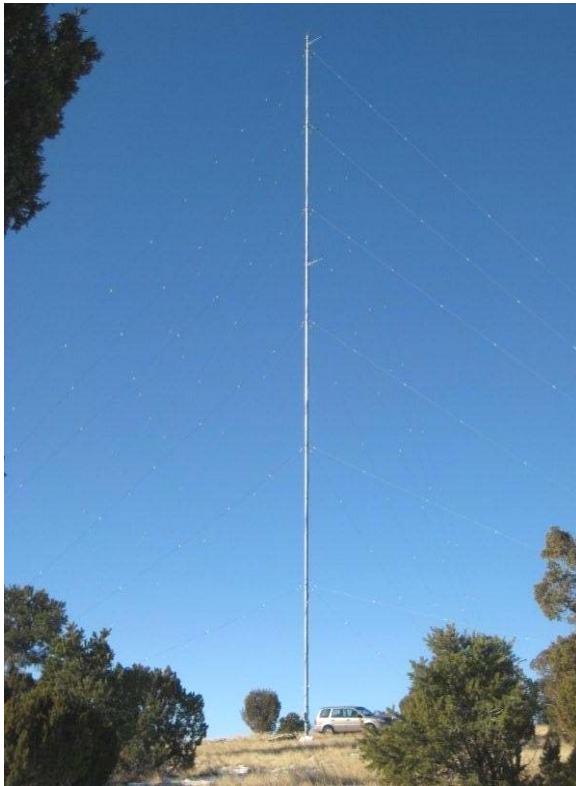
Source: 3 Phases Energy Services



Renewables



- Wind Study; 3-5 wind turbines is feasible (about 8-12% of Ft Carson energy use)

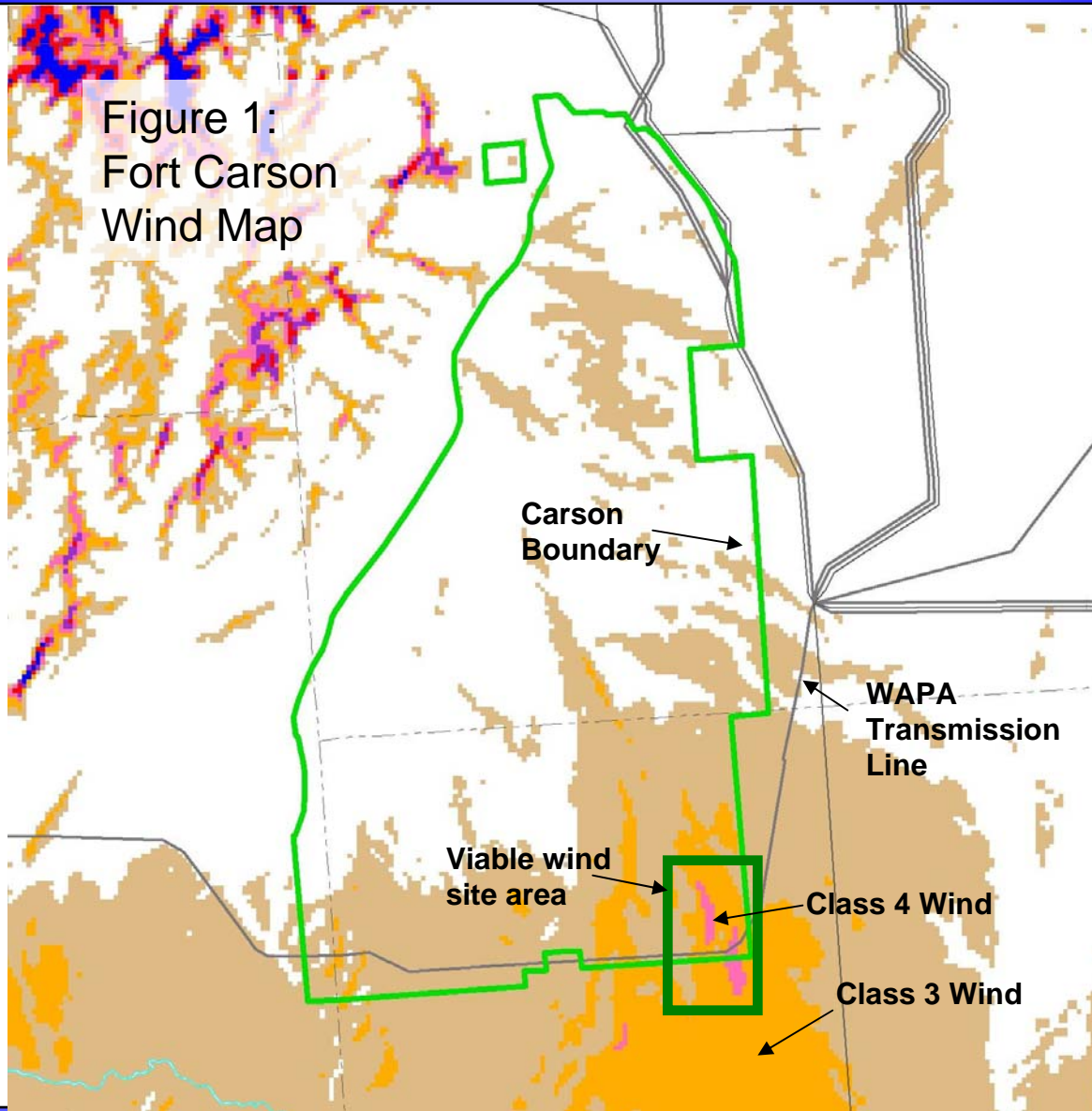




Renewables: Wind Site



Figure 1:
Fort Carson
Wind Map





Renewables



- Other technologies; transpired solar collectors, solar hot water, traffic signals, etc. (1-2% of Ft Carson energy use)





Renewables: Other Technologies



- Ground Source Heat Pumps (GSHP)
 - Technology eliminates natural gas use and replaces with electrical use; easier to get electricity from a renewable source
 - Band Training Facility and Soldier Family Assistance Center
- Biomass and Waste to Energy
- Concentrated Solar Power
- Small scale nuclear – Seriously!



Energy Intensity: Bottom Line



Project (s)	Description	Intensity Impact
BOILER REPLACEMENTS (Partially Completed)	\$1.1M cost under ECIP	1-2% Overall Natural Gas Reduction
EXPAND EMCS (Completed)	\$900K cost under ECIP	1% Overall Electrical Usage Reduction
LIGHTING UPGRADES (Scoping)	Using SRM Funds for lighting contractor	4-6% Overall Electrical Usage Reduction
GREENING IT INITIATIVE (Scoping)	Unknown Fund Source	1-2% Overall Electrical Usage Reduction
EEAP IMPROVEMENT PROJECTS (Waiting on Results)	Unknown Fund Source	???



Energy Intensity: Bottom Line



- Completed energy reduction projects can't keep up with energy consumption increases due to large amounts of new construction
- ESPC contracts not necessarily the best tool to complete energy projects
- Need energy intensity as priority in new construction



Energy Intensity; Recent projects



- Projects reducing energy intensity
 - Multiple boiler replacements, calculated savings of 18,000 MBTU/yr
 - Expansion of Energy Management Control System (EMCS), calculated savings of 11,000 MBTU/yr
 - Multiple facility renovations which included replacing HVAC systems, lighting systems, etc.



Energy Intensity; Identified but unfunded projects



- Projects to reduce energy intensity
 - High bay lighting retrofits and traffic signal retrofits, estimated reduction of installation electrical use 2-3%
 - Greening IT initiative, estimated reduction of electrical use 1-2%
 - Several improvement projects identified under recent EEAP, savings not yet quantified



How do we get to Net Zero?



- Focus on renewables and reduced energy intensity in new construction would help
- Need HQ support to allow inventive ways to get to Net Zero when land not available (power purchases)
- Need to implement effective technologies now...not tomorrow (GSHP, PV, etc.)



Next Steps for Ft Carson



- HQ will send Net Zero contractor team to Ft Carson for evaluation of opportunities in spring of 2009
- Command support and funding must follow for identified opportunities
- Continue pursuing and supporting all renewable opportunities not just at Ft Carson but in the region